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SWM SUSTAINABLE WILDLIFE MANAGEMENT PROGRAMME

INNOVATION CASE STUDY

Play more, live better!

USING GAMES TO HELP ADULTS AND CHILDREN COLLABORATE AND SOLVE COMPLEX PROBLEMS TOGETHER

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Background

Games can help people learn about complex issues, make choices and adapt their actions as they observe the consequences of their choices. Games allow adults and children to explore, safely, different scenarios and even different roles that can generate a variety of outcomes depending on the choices they make as they play the game.

The first decision-making simulation game was developed around 400 BCE by Sun Tzu, a Chinese military strategist, to gain insights into the dynamics of warfare. Multiplayer, role-playing games can help people learn to collaborate, develop and test problem-solving skills, and agree on strategies for tackling complex problems.

Dennis Meadows of the MIT Sloan School of Management developed a board game, called "Fishbanks", to enable his students to better understand the challenges of preventing or avoiding overfishing on the high seas. When he lectured on the topic, all his students would nod their heads, agreeing that fishermen would have to be crazy to wipe out a fish stock that their livelihoods depended on, but that is exactly what the students typically did when playing the game. This provoked lively discussions and better understanding of how it was possible for players to know that overfishing was not a sensible long-term strategy, but they still caused that outcome to happen almost every time they played the game.

Playing games is a tried-and-tested way to **promote learning and insights**. Unfortunately, many modern natural resource management games have been developed as university-level teaching tools, and typically require either a laptop computer or internet connection, or both.

> Experience from developing and playing these games with many communities confirms our belief that games that are fun to play, have few rules, rely on learning by doing, and enable failure, provoke discussion and collaborative problem solving, and are essential for adaptive social learning.

INNOVATION

The Sustainable Wildlife Management (SWM) Programme is a global initiative that aims to improve the conservation and sustainable use of wildlife in forest, savannah, and wetland ecosystems. To achieve this goal, SWM Programme teams work in close partnership with governments and over 80 rural communities in Africa, the Caribbean, Asia, and the Pacific to develop novel approaches and innovative solutions.

For the SWM Programme, "innovation consists of doing something new and different, whether solving an old problem in a new way, addressing a new problem with a proven solution, or bringing a new solution to a new problem." (United Nations Innovation Network, 2019)

This case study is not just a stand-alone success story; it is part of an *Innovation in Practice* series, which encompasses a variety of technical, social, legal, and institutional innovations. The series includes new ideas as well as improvements to existing ones, making good practices even better.

We hope that the SWM Programme *Innovation in Practice* series will spark new ways of working to **strengthen community-based sustainable wildlife management** worldwide. Please share this case study to help build a brighter future for both people and wildlife.

As part of the Sustainable Wildlife Management (SWM) Programme, which is funded by the European Union with co-funding from the French Facility for Global Environment and the French Development Agency, the SWM Programme partners (FAO, WCS, CIFOR-ICRAF and CIRAD) have been developing and **testing innovative no-tech or low-tech games**. Each needed to be simple and relatively quick to play, require only locally available and low-cost materials, and be appropriate for players with low levels of literacy and numeracy, with little or no experience with multiplayer and role-playing games. These games can be played without technology, but they do not preclude the use of smart phones or laptop computers to capture and analyse the outcomes generated by the players.

In southwestern Guyana the SWM Programme developed a series of schoolyard games to help children learn about nature conservation. In the Makira forests of northern Madagascar, we created a card game (Mchezo ya Kuku) to help adult women and men to explore how to successfully raise chickens for eggs, meat and income, and what might cause them to fail. We adapted this poultry production game in northern Republic of the Congo (ROC) (Mchezo ya Mifugo) to help families explore how to sustainably and profitably raise small ruminants like goats and sheep. In central Gabon, we developed a low-tech game to help local communities develop their sustainable hunting management plan. In the northern ROC and northeastern Democratic Republic of the Congo (DRC), we developed a no-tech game to help rural communities explore why wildlife populations they depend on for food and income are declining and what they could do together to reverse that trend. Finally, in Zimbabwe we developed a way for communities to explore the challenges and possible solutions to reducing human–wildlife conflict. This is more a participatory mapping process than a problem-solving game.

Social learning is essential for effective community-led conservation as it enables people to prioritize collective strategies and, most importantly, develop the social cohesion they need to work together, to solve their common problems.

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Games allow people, quickly and at no risk, to experiment with implementing different cours-es of action and determine which best achieve their goals.

GAMES

HUNTING-SUSTAINABILITY GAMES

POULTRY GAME

NATURE CONSERVATION GAMES

HUMAN–WILDLIFE CONFLICT GAME

Role-playing games are fun, engaging and valuable for social learning, whereby communities can devise strategies and learn to avoid undesired outcomes. Madagascar.
©FAO/Rijasolo

Hunting-sustainability games

Indigenous Peoples have been hunting wildlife, for food and to trade, for millennia. Using traditional, relatively inefficient weapons such as blowguns (e.g. Dayaks of Indonesia and Yanomami of Venezuela) or stone-tipped arrows (e.g. Efe of DRC and the Aka of Cameroon) indigenous hunters rarely had an adverse, widespread impact on the population size of the animals they hunted. However, adoption of new hunting technologies such as firearms and wire snares, in combination with growing human population density, improved access to remote areas and the arrival of commercial hunters, and ever-increasing conversion of wildlife habitat to farms, pastures and settlements means that most hunting of wildlife for food and income is now unsustainable. Today, animals are being removed from the wild faster than wildlife populations can replace them through reproduction.

The SWM Programme teams wondered how best to **promote discussion among groups** of hunters about the likely impact of hunting on the wildlife they depend on for food and income. Teams in DRC, ROC, Madagascar and Gabon decided that simple **role-playing games** might allow hunters to see how their individual decisions about how many animals to kill each time they go hunting might sustain or deplete the wildlife they target. The

The Nyama-Nyama (meat-meat) game in Gabon allows players to collectively explore the difficult process of designing rules and regulations for community hunting.
©FAO/Marco Gandolfo

The SWM Programme activities in ROC, DRC and Madagascar are implemented by WCS; and in Gabon by CIRAD.

teams thought that by playing these games, hunters might see how current hunting practices might be adversely influencing the abundance of wildlife populations they depend on for food and income, and might explore how alternatives to current practices might sustain wildlife populations for their families and their children and children's families.

In DRC, ROC and Madagascar, by playing the **Kuwinda Nyama game**, players simulate hunting by taking turns withdrawing dry beans from a bag or a bowl, with each bean representing one animal.

Hunting rules differ for each game. In the first scenario of Game 1 each hunter takes a turn, reaching into a cloth game-bag where they cannot see how many beans are in the bag, and removing as few or as many beans as they want. Without showing the other players, they drop the bean(s) into their own cloth bag. At the end of each round, after all players have hunted, the game manager counts the beans remaining in the game-bag without showing the players, and then adds 1 new bean for each "female" bean to represent reproduction within the population. For example, as we assume that 50 percent of the beans are female, that means if there are only 16 beans left, then 8 are female and so 8 offspring are added to the population that is available to be hunted in the next round.

In the second scenario of the first game, hunters withdraw beans from a bowl and drop them into a second bowl. This time every player sees how many "animals" are available to hunt and how many animals other players are hunting. Players are encouraged to discuss among themselves what they are observing as they play the game. These discussions have been observed to **influence hunting decisions** by players, and do provoke debate about hunting levels and the **sustainability of hunting**.

Subsequent games use multiple bowls to simulate spatial rotation of hunting, or use different coloured beans to represent species with slow (primates), medium (antelope) and rapid (rodent) reproductive rates. An easy-to-use mobile-phone app allows the outcomes of each game to be entered and results calculated and visualized automatically, though results can be visualized and discussed without this tech-addition.

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THE KUWINDA NYAMA GAME

Players	5 to 8 hunters and people engaged in wildlife trade for food
Purpose	to allow players and observers to see how individual hunters' decisions in different situations impact the wild animals they depend on
Materials	dry beans of different colours or sizes, small opaque cloth bags, plastic bowls
Information	
Coming soon!	**Kuwinda Nyama Game** English - includes three versions of the game
Coming soon!	**Kuwinda Nyama Jeu** French - includes three versions of the game

"For the first scenario, we didn't cooperate, which is why all the wildlife disappeared. For the second scenario, we defined hunting rules, which enabled us to keep animals in the forest."

Village hunter, Ituri, DRC.

The **Nyama-Nyama (meat-meat) game** in Gabon has similarities to the bean method used in DRC, ROC and Madagascar.

The Nyama-Nyama role-playing game was designed to enable newly-established village hunting associations to **observe the outcome of hunting:** a) where there are no rules; and then b) to observe what might work and what might not in terms of maintaining wildlife populations for both current and future hunters, based on rules developed, through discussion, by game players.

In Nyama-Nyama, participants play the roles of three different types of hunters: 1) occasional hunters who can hunt up to three times per round of the game; 2) regular hunters who can hunt up to six times per round; and 3) full-time hunters who can hunt up to nine times per round. In the first scenario of the game, there are no hunting rules; players are simply informed that they can go to the hunting area – i.e. a piece of plywood covered with a cloth that has seven holes, each with a bowl containing coloured beads representing different hunted wildlife species (wild pigs, antelope and buffalo), and white beads representing animals encountered but not caught. Hunters cannot see the beads within each bowl. Each bead represents a different wildlife species and each species has a different value to the hunter.

Each type of hunter is informed before the game starts that at the end of the game they need to have hunted a certain number of animals, with different numbers for occasional hunters, regular hunters and full-time hunters.

The most important parts of the games are the discussions that players have during and at the end of each game. Even more important are the comparisons players make between scenario 1 where hunting is more "everyone for themselves", and scenario 2 where hunting levels are more transparent or hunters impose rules on themselves. Players then talk about how they might implement more sustainable hunting in their local contexts.

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NYAMA-NYAMA GAME

Players	5 to 8 hunters and people engaged in wildlife trade for food
Purpose	to prepare hunting associations to design their own wildlife hunting management plan
Materials	coloured beads, a wooden board with 7 holes and 7 bowls, a screen or a curtain to separate the "village" and the "hunting ground"

After each round the players sum the value of their beads to determine if they have met their hunting objectives, and the bowls are replenished with new beads by the game manager to represent natural reproduction, much as the beans were in the previous example.

After four rounds of play each hunter is reminded of how often they failed or succeeded in reaching their assigned objectives and are told what the trends are in wildlife populations in the hunting area.

To emphasize the importance of **collective thinking and action**, and related difficulties, a playing session involves two scenarios played one after the other. In the first scenario players cannot communicate at all; they are therefore not able to share their feelings and ideas, and cannot design hunting rules and negotiation for their virtual hunting ground. During this first scenario, wildlife resources usually collapse after a few rounds of hunting. The second scenario allows players to discuss. Importantly, players are not explicitly asked to design hunting rules and regulations, but the game creates the conditions for the emergence of such negotiations.

"The game is a bit like going hunting. When you go hunting, you might see five or ten animals! But the game teaches you not to hunt them all on the same day"

Village hunter, Doumé, Lastoursville, Gabon

At the end of each round, the game manager counts how many animals (represented by the beans) have been hunted by the players and notes the number of beans on a roadmap to see whether the ''hunt" has been carried out sustainably. Republic of the Congo.
©FAO/Cindy Côté-Andreetti

Poultry game

Raising poultry to feed your family and to sell the eggs and meat to pay for health care, your children's education, and other essentials, sounds easy. You just get a few day-old chicks and let them forage near the house, and miraculously you have hens and eggs galore. As you can imagine, the reality is very different. During the rainy season, Newcastle disease caused by a virus can wipe out all your hens in a matter of days. Small carnivores – like fossa in Madagascar, foxes in Europe, genets in the Congo basin, and ocelots in South America – can slaughter a flock of hens in minutes. Your neighbour might decide that you will not notice if he steals one of your fat hens to feed his hungry children. Raising chickens is not so simple after all. Raising hens requires a lot of decisions. Thoughtful decisions, based on your personal experience, about how to invest your scarce labour and even scarcer money. Poor decisions based on lack of knowledge can easily lead to disaster, and the loss of the birds you have already invested time and effort to produce.

Many conservation and development projects have promoted the production of backyard poultry, but have failed because families may at times not make the best decisions. Not because they are foolish or lazy, but because they have little or no experience raising hens, or ducks or guinea fowl.

Playing card games offers a fun and engaging way for communities to explore the issues around successfully raising poultry. Madagascar.
©FAO/Rijasolo

The SWM Programme activities in Madagascar are implemented by WCS.

The Malagasy staff of the SWM Programme working with communities around the Makira National Park in the forests of northern Madagascar were keen to support local families' efforts to provide a sustainable source of nutritious food as an **alternative to hunting and eating highly endangered lemurs**. Women in the villages wanted to produce poultry for their eggs and meat but lacked experience doing so.

The SWM Programme team thought about starting a model poultry farm in one village, but realized that travel times from all the other villages would make regular observation of how to raise poultry a logistical impossibility. The team had conducted several training workshops in the villages but worried that participants might just be passive learners and would not truly learn the problem-solving skills they would need to raise poultry successfully. Then the team thought, "Could we create a role-playing game?" that would enable players to make decisions about when and why to invest their time and money in raising poultry, and see in a matter of minutes rather than days or weeks the results of these decisions.

So the team created the **Mchezo ya Kuku poultry production card game** in which individual players could make decisions about buying chicks, hens and roosters, or paying for poultry food, or vaccinations, or the construction of a henhouse. The objective of the game is to **raise as many chickens as possible** during the course of the game. If players decide to spend their money to buy chicks but did not pay for a henhouse, then if during a round of the game they draw a Fossa card they will lose some or all of their hens. If they paid for vaccinations and draw a Newcastle disease card, none of their hens will die. During each round, the players have to decide how to respond to the card they draw from the deck. And the impact of drawing certain cards, like the Newcastle disease card, are determined by prior decisions made by that player.

People have great fun playing the game. In fact, several villages asked if they could keep the cards so that they could continue to play the game even when the SWM Programme team were not in the village.

MCHEZO YA KUKU GAME

Players	5 to 8 women and men from a rural community
Purpose	to allow players and observers to see how players' decisions influence the success or failure of their virtual efforts to raise a flock of chickens
Materials	a deck of poultry game playing cards
Information	
Coming soon!	**Mchezo ya Kuku** English
Coming soon!	**Mchezo ya Kuku** French

SWM Programme community poultry training videos

English

French

Playing the game in a public space with villagers looking on extends the number of people who can learn about the consequences of players' decisions on **how to invest their time and money** to raise poultry.

After the first series of games was played the team held a "pause and reflect" session to discuss the game – what worked, what could be improved, and what did not work and should be eliminated in future games. In this way the team was able to learn and improve the game over time and the game was then adapted for the DRC and ROC sites.

Rules for the game, and images of the playing cards, are available for free in English and French.

The poultry production game developed in Madagascar was adapted for communities in northern ROC where families try and often fail to raise sheep and goats for their meat and milk. Mchezo ya Mifuo is also a card game and the rules are similar to those developed for poultry production. Playing the game successfully provoked player and audience discussions of why raising small livestock is hard, why it often fails, and what choices livestock owners might make to grow their flocks and **improve their dietary and income security**.

The poultry game allows communities to understand how to develop a chicken farm in a fun and engaging way.
©FAO/Rijasolo

Nature conservation games

School-age children, wherever they live around the world, are not the cause of environmental degradation, the overexploitation of natural resources and the loss of species. But what they learn at school can profoundly influence both how they think about nature, and the life choices they will make as adults, raising their own children.

In the southwest of Guyana the SWM Programme staff were looking for **practical and entertaining ways** for children to learn about nature conservation and the impact of decisions they might make on the natural world. Working together with staff of the South Rupununi Conservation Society (SRCS) the team developed and tested **14 different games** that can be played outside in the schoolyard or inside a classroom. All games are led and facilitated by adults, for example, teachers, wildlife club coordinators or wildlife rangers.

Games like "Turtle Beach", "Caught in the Seine" and "Flying Fish" involve the children being hunted or fished by some of their classmates. Our Resources game teaches the children that natural resources are not evenly distributed across the landscape, whereas "That's my Land!" teaches how collaboration and communication are important for group problem solving. Still others like "Rupununi's Web of Life" and "Musical Chairs" teach about the **interconnectedness of nature**.

The "Turtle Beach" game in Guyana helps children learn about the importance of not overharvesting turtles.
©FAO/Luke Mckenna

The SWM Programme activities in Guyana are implemented by CIFOR-ICRAF.

To explain the games to teachers and other adults who work with children, the team published a manual **EcoPlayers – Keeping the Rupununi wild through games** that describes the aim of each game, the appropriate number and age of players, the materials needed, how to set up the game, instructions on how to play the game, and teaching points for the adults to discuss with the players at the end of the game. The manual also includes a list of environmentally-friendly activities, and encourages children to complete one activity every day, for 30 days.

Success of the schoolyard games with teachers and children in Guyana resulted in the idea being emulated by the USAID-supported FORET project in Yangambi, DRC. In this case a series of games and outdoor activities were designed to help members of the youth Nature Clubs Zamba to **learn about the tropical rainforest** that they live near, but may never have ventured inside.

The games are intended for children aged eight years or older and they have all been designed to raise their awareness of key aspects of wildlife management.

The team in Guyana have developed a manual with dozens of environmentally-friendly outdoor activities for children to play.
©FAO/Luke McKenna

ECOPLAYER GAMES

Players	5 to 20 school-age children 10 years of age or older
Purpose	to allow players to learn about sustainable use of natural resources
Materials	the list is different for every game
Information	EcoPlayers - Keeping the Rupununi wild through games

"They learned about the consequences of overharvesting animals and the importance of leaving turtles alone during the breeding season. They really enjoyed it. They were laughing a lot and that is always a good sign!"

Alyssa Melville,
Environmental Education
Coordinator for the SRCS, Guyana

Human–wildlife conflict game

Rural families, in many places around the planet, fear that their food supply, sources of income, and physical safety are **threatened by the wild animals** they live near.

A family of elephants can destroy a human family's whole field of maize or plantains in a matter of minutes. Baboons can sift the soil of a newly planted field, eating all the peanuts that, if left to germinate, would produce food and income for the farming family. Hippos moving from their daytime river refuges to their night-time grazing areas can, out of fear, trample and kill adults and children who inadvertently get in their way. Women and children, who are often responsible for household duties, such as gathering water or washing clothes in local rivers, are particularly vulnerable to attacks by crocodiles. Huge flocks of small seed-eating birds (e.g. red-billed quelea) can descend on a wheat, millet or sorghum field and devour every single seed, leaving the farmer family with little to eat or sell that year.

Game pieces showing, on the left, a field with elephants (yellow sticks are a wildlife trail) and a watch tower, chili brick and trench as solutions, and, on the right, a livestock waterhole along a river, a crocodile and crocodile fence as a solution.
©CIRAD

The SWM Programme activities in Zambia are implemented by CIFOR-ICRAF; in Zimbabwe by CIRAD; and in Botswana and Namibia by FAO.

Human–wildlife conflict (HWC) occurs everywhere people and wild animals live close together. Understanding where, when, why and with which wildlife conflicts occur is essential to reducing or halting threats to people's food, income and physical security, and to preventing retaliatory killing of wildlife and calls for fencing to exclude wildlife from human-dominated landscapes.

To support community efforts to reduce HWC the SWM Programme team in Zimbabwe and Zambia developed and tested a participatory exercise (**Human–Wildlife Conflict Game**) where community members could work together to map where HWC occurred frequently in their traditional territory. Using wooden blocks printed with different symbols to represent village assets, and narrow wooden sticks of different colours to represent roads, rivers and animal trails around the village, community members together mapped the location of valuable resources or assets to the community, like granaries, livestock corrals or water sources. After creating the map, participants were able to indicate on the map where wild animals' behaviour posed a risk to families. Finally, for each HWC location, community members could, after discussion, choose from a set of predefined mitigation options those that best represented their ability to implement effectively and reduce or halt HWC.

Farmer Field School participants exploring ways to reduce HWC during a games workshop in Binga, Zimbabwe.
©CIRAD

HUMAN–WILDLIFE CONFLICT GAME

Participants	The game is designed for a maximum of 6 to 8 players
Purpose	The human-wildlife conflict role-playing game has two goals to integrate farmers' ideas into a strategy to reduce HWC and to assist communities affected by HWC by exploring different solutions.
Materials	Wood blocks and sticks or strong cardboard, paints (black, blue, yellow, green and red), rubber stamps with black ink, 2 m x 1 m green play mat
Information	User guide on human-wildlife conflict role-playing games
Duration	It will take around an hour to explain to the community members how to use the HWC-RPG, and moderate a game session.

Lessons learned

A famous British statistician named George Box wrote, "All models are wrong, some are useful." **All games are models (simplifications) of reality**. So they are likely, in some ways, to be wrong, in that they do not incorporate every single aspect of an issue or problem. But games are, in our experience and the experience of many others, enormously useful.

Games allow people to explore together the outcomes of their individual and group decisions. They allow people to experiment with different todays and alternate tomorrows, without any tangible risks of failure. For example, during a game, players might decide to use a new highly lethal technology that increases daily fish catch. As a consequence they wipe out a fish population their families depend on for food and income. But at the end of the game, though all the fish have been depleted, the real-world fish population remains unchanged as does their families' access to food and a valued commodity to sell.

Multiplayer games enable **discussions among communities of practice** (fishers, hunters, gatherers, producers) about how individual and group decisions and actions influence the outcomes they desire. They even enable communities of practice to devise strategies that they, as individuals or together, are willing to implement to avoid the undesired outcomes they observed by playing the game.

We need to learn which games are most effective in helping individuals and communities both understand the consequences of their choices and find ways to reach consensus solutions to encourage individual and group actions that result in desired outcomes and avoid the self-interested actions of individuals, depleting natural resources and compromising the well-being of the community.

Games help make complex issues tangible, games remove the risks associated with bad decisions, games help us see alternative futures, and games are fun. We need more social learning games.

Residents in the Tsarabajina learning to develop a chicken farm while avoiding the various pitfalls, such as disease or attacks by predators. Madagascar.
©FAO/Rijasolo

The SWM Programme is a major international initiative that aims to improve the conservation and sustainable use of wildlife in forest, savannah and wetland ecosystems. It is being funded by the European Union with co-funding from the French Facility for Global Environment (FFEM) and the French Development Agency (AFD). Projects are being piloted and tested with governments and communities in 17 participating countries. The initiative is coordinated by a dynamic consortium of four partners, namely the Food and Agriculture Organization of the United Nations (FAO), the Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF), the French Agricultural Research Centre for International Development (CIRAD) and the Wildlife Conservation Society (WCS).

FIND OUT MORE

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